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EXAMINER
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SUNG, CHRISTINE

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/914,928  
Filing Date: September 06, 2001  
Appellant(s): VERGER ET AL.

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Khaled Shami  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed October 19, 2007 appealing from the Office action mailed September 4, 2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is incorrect.

The amendment after final filed on August 20, 2007 has been entered.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

"Whether claims 1-2, 4, 7-10,13-17 and 19 are anticipated under 35 U.S.C 102(e) by U.S. Pat. No. 5,892,227 (Schieber, hereinafter, "Schieber").

Whether Claims 3,12, 18 and 20 are unpatentable under 35 U.S.C. 103(a) over Schieber.

Whether claims 5-6 are unpatentable under 35 U.S.C. 103(a) over Schieber in view of the admitted prior art."

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

5,892,227                                      Schieber                                      4-1999

Appellant's admitted prior art, see specification, page 7, lines 26-31.

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-2, 4, 7-10, 13-17 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Schieber (US Patent 5,892,227 A).

Regarding claim 1, Schieber discloses an x-ray imagery device (Figure 5) comprising at least one detection matrix, said detection matrix comprising:

An electric charges reading panel (element “Si Substrate”) having an area equal to or larger than about 10 cm x 10 cm (column 14, line 24), said electric charges reading panel including a monocrystalline silicon substrate (Figure 5, Si Substrate) integrating a plurality of electronic devices (column 6, lines 14-27); and

A detection layer (figure 5, element  $\text{HgI}_2$ ) made of a continuous layer of semiconducting material (claims 2-5) deposited in vapor phase on the electric charges reading panel (figure 6, semiconducting layer is vapor deposited), the detection layer converting incident x-photons into electric charges (column 4, lines 42-53), each electronic device and a portion of the detection layer formed thereon forming a respective pixel of the detection matrix (claim 10).

Regarding claim 2, Schieber discloses a process for making an x-radiation imagery device (claim 21) comprising at least one detection matrix, said detection matrix comprising

An electric charges reading panel (element "Si Substrate") having an area equal to or larger than about 10 cm x 10 cm (column 14, line 24), said electric charges reading panel including a monocrystalline silicon substrate (Figure 5, Si Substrate) integrating a plurality of electronic devices (column 6, lines 14-27); and

A detection layer (figure 5, element  $\text{HgI}_2$ ) made of a semiconducting material (claims 2-5) converting incident x-photons into electric charges (column 4, lines 42-53), said process comprising:

Forming the electronic devices on the monocrystalline silicon substrate to produce the electric charges reading panel (column 6, lines 16-27); and

Vapor phase depositing the semiconducting material on the electric charges reading panel so as to form the detection layer made of a continuous layer of the semi conducting material (column 11, lines 66- column 12-line 17), thereby forming a matrix of detection pixels (claim 10), each detection pixel including a corresponding electronic device and a portion of the detection layer formed thereon.

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Regarding claim 4, Schieber discloses that the semiconducting material used to make the matrix of detection pixels is CdTe, HgI<sub>2</sub>, or PbI<sub>2</sub> (Claims 3, 2 and 5 respectively).

Regarding claim 7, Schieber discloses that the detection layer is deposited directly on the electronic devices of the electric charges reading panel in each pixel (column 12, lines 30-33).

Regarding claim 8, Schieber discloses that the semiconducting material of the detection layer is crystalline silicon (see figure 5, "Si substrate").

Regarding claim 9, Schieber discloses that the electronic devices comprise at least one of an amplifier, preamplifier, filter or processing circuit (see column 6, lines 26-27).

Regarding claim 10, Schieber discloses that the processing circuit includes a counting circuit (column 7, lines 47-51).

Regarding claim 13, Schieber discloses assembling more than one detection matrix to form a large area digital detector (column 14, lines 22-28).

Regarding claim 14 Schieber discloses an x-radiation imagery device comprising at least one detection matrix, said detection matrix comprising:

An electric charges reading panel (element "Si Substrate") having an area equal to or larger than about 10 cm x 10 cm (column 14, line 24), said electric charges reading panel including a monocrystalline silicon substrate (Figure 5, Si Substrate) integrating a plurality of electronic devices (column 6, lines 14-27), each electronic device including an amplifier (claim 8);

A detection layer (figure 5, element HgI<sub>2</sub>) made of a continuous layer of semiconducting material (claims 2-5) deposited in vapor phase on the electric charges reading panel (figure 6, semiconducting layer is vapor deposited), the detection layer converting incident x-photons into

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electric charges (column 4, lines 42-53), each electronic device and a portion of the detection layer formed thereon forming a respective pixel of the detection matrix (claim 10).

Regarding claim 15, Schieber discloses that the electronic devices comprise at least one of an amplifier, preamplifier, filter or processing circuit (see column 6, lines 26-27).

Regarding claim 16, Schieber discloses a process for making an x-radiation imagery device (claim 21) comprising at least one detection matrix, said detection matrix comprising

An electric charges reading panel (element "Si Substrate") having an area equal to or larger than about 10 cm x 10 cm (column 14, line 24), said electric charges reading panel including a monocrystalline silicon substrate (Figure 5, Si Substrate) integrating a plurality of electronic devices (column 6, lines 14-27); and

A detection layer (figure 5, element  $\text{HgI}_2$ ) made of a semiconducting material (claims 2-5) converting incident x-photons into electric charges (column 4, lines 42-53), said process comprising:

Forming the electronic devices on the monocrystalline silicon substrate to produce the electric charges reading panel (column 6, lines 16-27) each electronic device including an amplifier (claim 8); and

Vapor phase depositing the semiconducting material on the electric charges reading panel so as to form the detection layer made of a continuous layer of the semi conducting material (column 11, lines 66- column 12-line 17), thereby forming a matrix of detection pixels (claim 10), each detection pixel including a corresponding electronic device and a portion of the detection layer formed thereon.

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Regarding claims 17 and 19, Schieber discloses that the device has a detection area of a  $10 \times 10 \text{ cm}^2$  to  $10 \times 10 \text{ cm}^4$  (claim 6).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 12, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schieber (US Patent 5,892,227 A).

Regarding claims 3 and 12, Schieber discloses the limitations set forth in claim 2. Although Schieber does not explicitly state that the temperature of the deposition process of the semiconducting material be at a temperature that does not damage the electronic device, it would have been obvious to one having ordinary skill in the art to have chosen an appropriate temperature that would not exceed the highest tolerable temperature of the electronic devices, so as to not render the device useless. It is well-known in the art, when successively depositing layers of a device, to select a proper temperature and/or order to ensure preceding layers are not destroyed.

Regarding claim 18 and 20, Schieber does not explicitly specify the dimensions of the silicon wafer, however 1- 12 inch diameter wafers (5-30 cm diameter wafers) are well known conventional stock wafers (see pertinent art references). Thus, even though Schieber does not explicitly disclose the wafer dimensions, it would have been obvious to one having ordinary skill in the art to use stock silicon wafers, which have conventional dimensions of 5-30 cm.



5. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schieber (US Patent 5,892,227 A) over the admitted prior art.

Regarding claim 5-6, Schieber discloses that the electronic devices are made using photolithography (column 12, lines 34-43). Schieber does not explicitly state the particular feature sizes, however, applicant discloses that the such feature sizes are conventional (page 7, lines 26-31). Thus, it is obvious to one having ordinary skill in the art to make conventional electronic devices with conventional feature sizes in order to reduce production costs and take advantage of well-known manufacturing techniques.

**(10) Response to Argument**

**35 U.S.C. 102(e) rejections based on Schieber**

**Claim 1**

Appellant argues that the Schieber reference fails to disclose 1) a mono crystalline silicon substrate integrating a plurality of electronic devices and 2) a detection layer made of a continuous layer of semiconducting material deposited in vapor phase on the electric charges reading panel. The examiner respectfully disagrees for the following reasons.

First, Appellant argues **Figure 4** does not disclose the elements, however, the previous rejection makes reference to **Figure 5**, which clearly discloses a silicon substrate (Silicon substrate = electric charges reading panel). Figure 4 is not mentioned in the rejection of this claim. Schieber discloses that the substrate is made of a single crystal or monocrystalline material (see column 11, lines 32-40).

Second, Appellant argues that Schieber does not specify integrating a plurality of electronic devices with the silicon substrate. The examiner respectfully disagrees. Referring to

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figure 5, "row electrodes," which are a part of the electronic devices, are integrated with the silicon substrate. Further, even if the limitation is read to require more than electrodes to qualify as "electronic devices" the claim only requires that the silicon substrate be "integrated" or in contact with "electronic devices." There is no requirement that the electronic devices be embedded within the substrate. Appellant argues that Figure 7 shows that the electronic devices are separate from the detection layer, however appellant's own claim merely requires that the electronic devices are integrated, and thus only require that the electronic devices be united with the detector.

Third, Appellant argues that Schieber fails to disclose a detection layer made of a continuous layer of semiconducting material deposited in vapor phase on the electric charges reading panel. The examiner respectfully disagrees. Referring to Figure 6, the substrate or electric charges reading panel, is placed in the substrate holder. Then, a film of semiconducting material is deposited by vapor deposition (see column 11, line 66- column 12, line 3). Thus, figure 5, discloses a continuous ( $\text{HgI}_2$  Thin layer) semiconducting layer ( $\text{HgI}_2$  is a semiconductor by definition) vapor deposited (see figure 6) on the electric charges reading panel (Silicon Substrate).

### Claim 2

Appellant argues that the Schieber reference fails to disclose a process for making an x-radiation imagery device comprising 1) forming a plurality of electronic devices on a mono crystalline silicon substrate to produce an electric charges reading panel and 2) vapor depositing the semiconducting material on the electric charges reading panel so as to form the detection

layer of a continuous layer of the semiconducting material, thereby forming a matrix of detection pixels.. The examiner respectfully disagrees for the following reasons.

First, Appellant argues **Figure 4** does not disclose the elements, however, the previous rejection makes reference to **Figure 5**, which clearly discloses a silicon substrate (electric charges reading panel). Figure 4 is not mentioned in the rejection of this claim. Schieber discloses that the substrate is made of a single crystal or monocrystalline material (see column 11, lines 32-40).

Second, Appellant argues that Schieber does not specify integrating a plurality of electronic devices with the silicon substrate. The examiner respectfully disagrees. Referring to figure 5, “row electrodes”, which are a part of the electronic devices, are integrated with the silicon substrate. Further, even if the limitation is read to require more than electrodes to qualify as “electronic devices” the claim only requires that the silicon substrate be “integrated” or in contact with “electronic devices.” There is no requirement that the electronic devices be embedded within the substrate. Appellant argues that Figure 7 shows that the electronic devices are separate from the detection layer, however appellant's own claim merely requires that the electronic devices are integrated, and thus only require that the electronic devices be united with the detector.

Third, Appellant argues that Schieber fails to disclose a detection layer made of a continuous layer of semiconducting material deposited in vapor phase on the electric charges reading panel. The examiner respectfully disagrees. Referring to Figure 6, the substrate or electric charges reading panel, is placed in the substrate holder. Then, a film of semiconducting material is deposited by vapor deposition (see column 11, line 66- column 12, line 3). Thus

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figure 5, discloses a continuous ( $\text{HgI}_2$  Thin layer) semiconducting layer ( $\text{HgI}_2$  is a semiconductor by definition) vapor deposited (see figure 6) on the electric charges reading panel (Silicon Substrate).

#### Claim 14

Appellant argues that the Schieber reference fails to disclose 1) an electric charges reading panel having an area equal to or larger than about  $10 \times 10$  cm, said electric charges reading panel including a mono crystalline silicon substrate integrating a plurality of electronic devices, each electronic device including an amplifier and 2) a detection layer made of a continuous layer of semiconducting material deposited in vapor phase on the electric charges reading panel, the detection layer converting incident x-rays into electric charges, each electronic device and a portion of the detection layer formed thereon forming a respective pixel of the detection matrix. The examiner respectfully disagrees for the following reasons.

First, Appellant argues **Figure 4** does not disclose the elements, however, the previous rejection makes reference to **Figure 5**, which clearly discloses a silicon substrate (Silicon substrate = electric charges reading panel). Figure 4 is not mentioned in the rejection of this claim. Schieber discloses an electric charges reading panel (Figure 5, element Si Substrate) having an area equal to or larger than about  $10 \times 10$  cm (column 14, line 24), said electric charges reading panel including a mono crystalline silicon substrate (see column 11, lines 32-40).

Second, Appellant argues that Schieber does not specify integrating a plurality of electronic devices with the silicon substrate. The examiner respectfully disagrees. Referring to figure 5, “row electrodes”, which are a part of the electronic devices, are integrated with the silicon substrate. Further, even if the limitation is read to require more than electrodes to qualify

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as “electronic devices” the claim only requires that the silicon substrate be “integrated” or in contact with “electronic devices.” There is no requirement that the electronic devices be embedded within the substrate. Appellant argues that Figure 7 shows that the electronic devices are separate from the detection layer, however appellant's own claim merely requires that the electronic devices are integrated, and thus only require that the electronic devices be united with the detector. Further, Schieber discloses an amplifier (claim 8 discloses a Pre amplifier) “integrated” with the silicon substrate.

Third, Appellant argues that Schieber fails to disclose a detection layer made of a continuous layer of semiconducting material deposited in vapor phase on the electric charges reading panel. The examiner respectfully disagrees. Referring to Figure 6, the substrate or electric charges reading panel, is placed in the substrate holder. Then, a film of semiconducting material is deposited by vapor deposition (see column 11, line 66- column 12, line 3). Thus figure 5, discloses a continuous ( $\text{HgI}_2$  Thin layer) semiconducting layer ( $\text{HgI}_2$  is a semiconductor by definition) vapor deposited (see figure 6) on the electric charges reading panel (Silicon Substrate).

#### Claim 16

Appellant argues that the Schieber reference fails to disclose a method for making an x-ray imagery device comprising: 1) forming electronic devices on a monocrystalline silicon substrate to produce an electric charges reading panel, each of the electronic devices including an amplifier and 2) vapor depositing a semiconducting material on the electric charges reading panel so as to form a continuous detection layer made of the semiconducting material, thereby forming a matrix of detection pixels, each detection pixel including a corresponding electronic

device and a portion of the detection layer formed thereon. The examiner respectfully disagrees for the following reasons.

First, Appellant argues **Figure 4** does not disclose the elements, however, the previous rejection makes reference to **Figure 5**, which clearly discloses a silicon substrate (Silicon substrate = electric charges reading panel). Figure 4 is not mentioned in the rejection of this claim. Schieber discloses an electric charges reading panel including a mono crystalline silicon substrate (see column 11, lines 32-40).

Second, Appellant argues that Schieber does not specify integrating a plurality of electronic devices with the silicon substrate. The examiner respectfully disagrees. Referring to figure 5, “row electrodes”, which are a part of the electronic devices, are integrated with the silicon substrate. Further, even if the limitation is read to require more than electrodes to qualify as “electronic devices” the claim only requires that the silicon substrate be “integrated” or in contact with “electronic devices.” There is no requirement that the electronic devices be embedded within the substrate. Appellant argues that Figure 7 shows that the electronic devices are separate from the detection layer, however appellant's own claim merely requires that the electronic devices are integrated, and thus only require that the electronic devices be united with the detector.

Third, Appellant argues that Schieber fails to disclose a detection layer made of a continuous layer of semiconducting material deposited in vapor phase on the electric charges reading panel. The examiner respectfully disagrees. Referring to Figure 6, the substrate or electric charges reading panel, is placed in the substrate holder. Then, a film of semiconducting material is deposited by vapor deposition (see column 11, line 66- column 12, line 3). Thus

figure 5, discloses a continuous (HgI<sub>2</sub> Thin layer) semiconducting layer (HgI<sub>2</sub> is a semiconductor by definition) vapor deposited (see figure 6) on the electric charges reading panel (Silicon Substrate).

**Rejection of claims under 35 U.S.C. 103(a)**

Applicant makes no additional argument specific to the obviousness rejections, but merely argues that limitations are missing. This argument has been addressed in the above paragraphs.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section **(9)** above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

**(1) Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

**(2) Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth

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in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

/Christine Sung/

Conferees:

/David P. Porta/

Supervisory Patent Examiner, Art Unit 2884

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TQAS Appeal Specialist, TC 2800